

WHAT IS CLAIMED IS

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1. A magnetic disk drive, comprising:

a magnetic disk carrying a magnetic film,  
said magnetic disk being rotatable about a rotational  
axis;

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a motor causing said magnetic disk to rotate  
about said rotational axis;

a swing arm pivoted on a pivot axis so as to  
scan a surface of said magnetic disk generally in a  
radial direction thereof; and

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a magnetic head provided on said swing arm,  
said magnetic disk carrying thereon a carbon  
film so as to cover said magnetic film,

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wherein said carbon film contains therein  
oxygen atoms such that said oxygen atoms form any of  
an ether bonding or a carbonyl bonding with carbon  
atoms constituting said carbon film.

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2. A magnetic disk drive as claimed in claim  
1, wherein said carbon film contains said oxygen atoms  
with a proportion of 0.1% or more but 7% or less with  
respect to said carbon atoms.

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3. A magnetic disk drive, comprising:

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a magnetic disk carrying a magnetic film,  
said magnetic disk being rotatable about a rotational  
axis;

a motor causing said magnetic disk to rotate about said rotational axis;

a swing arm pivoted on a pivot axis so as to scan a surface of said magnetic disk generally in a radial direction thereof; and

a magnetic head provided on said swing arm, said magnetic disk carrying thereon a carbon film so as to cover said magnetic film,

wherein said carbon film contains therein oxygen atoms and nitrogen atoms.

4. A magnetic disk drive as claimed in claim 3, wherein said carbon film contains said oxygen atoms with a proportion of 0.1% or more but 7% or less with respect to carbon atoms constituting said carbon film.

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5. A magnetic disk comprising:  
a substrate;  
a magnetic film formed on said substrate;  
and  
a carbon film covering said magnetic film,  
said carbon film containing therein oxygen atoms such that said oxygen atoms form any of an ether bonding or carbonyl bonding with carbon atoms constituting said carbon film.

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6. A magnetic disk as claimed in claim 5, wherein said carbon film contains said oxygen atoms

with a proportion of 0.1% or more but 7% or less with respect to said carbon atoms constituting said carbon film.

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7. A magnetic disk, comprising:

a substrate;

10 a magnetic film formed on said substrate;

and

a carbon film covering said magnetic film,  
said carbon film containing therein oxygen  
atoms and nitrogen atoms.

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8. A magnetic disk as claimed in claim 7,  
20 wherein said carbon film contains said oxygen atoms  
with a proportion of 0.1% or more but 7% or less with  
respect to carbon atoms constituting said carbon film.

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9. A method of making a magnetic disk,  
comprising the steps of:

depositing a magnetic film on a substrate;

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depositing a carbon film on said magnetic  
film,

said step of depositing said carbon film is  
conducted in a plasma atmosphere containing an inert  
35 gas and oxygen.

10. A method as claimed in claim 9, wherein said plasma atmosphere further contains nitrogen.

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11. A method as claimed in claim 9, wherein said step of depositing said carbon film comprises a sputtering process using a carbon target.

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12. A method as claimed in claim 11, wherein said sputtering process is conducted in a state in which a magnetic field is applied to said plasma atmosphere.

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13. A magnetic disk drive comprising:  
a rotary magnetic disk;  
a magnetic head scanning a surface of said  
25 rotary magnetic disk in a state that said magnetic head is floated from said surface of said rotary magnetic disk;  
an arm carrying said magnetic head; and  
a drive mechanism driving said arm,  
30 wherein said magnetic disk carries a lubricating film containing therein a photocrosslinking functional group, said photocrosslinking functional group causing a crosslinking in said lubricating film.

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14. A magnetic disk drive as claimed in claim 13, wherein said photocrosslinking functional group is selected from the group consisting of: an alkenyl group, an alkenyl halide group, an aryl halide group, an aryl azide group, piperonyl group and epoxy group.

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15. A magnetic disk drive as claimed in claim 13, wherein said magnetic disk is covered with a carbon film deposited by a CVD process and wherein said lubricating film is formed on said carbon film.

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16. A method of making a magnetic disk, comprising the steps of:  
coating a disk surface with a lubricating layer comprising molecules having a photocrosslinking functional group;  
causing a crosslinking in said molecules by applying an optical radiation to said lubricating layer.

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17. A method as claimed in claim 16, wherein said step of causing said crosslinking is conducted by applying a substantially monochromatic far-ultraviolet radiation having a half-height width of 15nm or less as said optical radiation.

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18. A method as claimed in claim 16, wherein  
said photocrosslinking functional group is selected  
from the group consisting of: an alkenyl group, an  
alkenyl halide group, an aryl halide group, an aryl  
5 azide group, piperonyl group and epoxy group.

10 19. A method as claimed in claim 16, wherein  
said step of causing said crosslinking is conducted  
while applying heat to said lubricating layer.

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20. An apparatus for producing a magnetic  
disk, comprising:

20 a disk holder adapted to hold a magnetic  
disk coated with a lubricating film;

a processing chamber accommodating said disk  
holder, said processing chamber applying a processing  
to said magnetic disk held on said disk holder;

25 a far-ultraviolet optical radiation source  
provided in said processing chamber so as to irradiate  
said lubricating film on said magnetic disk with an  
optical radiation in the state that said magnetic disk  
is held in said disk holder; and

30 a heat source provided in said processing  
chamber so as to heat said magnetic disk in the state  
that said magnetic disk is held in said disk holder,

wherein said far-ultraviolet source produces  
a monochromatic ultraviolet radiation characterized by  
a half-width height of 1.5nm or less.

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21. A fluorocarbon resin composition,  
comprising: a resin skeleton; and  
a tri-organosilyl group not causing  
hydrolysis or dehydration condensation, represented by  
5 a general formula



10 wherein  $R^1$ ,  $R^2$ ,  $R^3$  represent independently or commonly  
any of an alkyl group, an aryl group and an aralkyl  
group, including those substituted with halogen or  
nitrogen, as an endcap group of said resin skeleton.

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20 22. A fluorocarbon resin composition as  
claimed in claim 21, wherein at least one of said  
functional groups  $R^1$ ,  $R^2$  and  $R^3$  is selected from the  
group consisting of an alkenyl group having 2-20  
carbon atoms, an aryl group having 6-30 carbon atoms,  
and an aralkyl group having 7-30 carbon atoms.

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30 23. A fluorocarbon resin composition as  
claimed in claim 21, wherein said functional groups  $R^1$ ,  
 $R^2$  and  $R^3$  are selected from the group consisting of a  
phenyl group and a benzyl group.

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24. A method of forming a fluorocarbon resin

having an endcap group represented by a formula



(R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> represent independently or commonly any of an alkyl group, an aryl group and an aralkyl group, including those substituted with halogen or nitrogen).

said method comprising the step of:

silylzing a fluorocarbon resin having OH at an end gap group by any of chlorosilane, silylamine and silylamide.

25. A method as claimed in claim 24, wherein said step of silylzing comprises the steps of:

dissolving a fluorocarbon resin having a hydroxyl endcap group and an amine catalyst into a solvent having a C-F bond and further one of a C-H bond and a C-Cl bond to form a solution; and adding tri-organo chlorosilane further to said solution.

26. A fluorocarbon resin having an endcap group represented by a formula



wherein R<sup>4</sup>, R<sup>5</sup> and R<sup>6</sup> represent commonly or



independently a hydrogen atom or an organic group, at least one of said groups  $R^4$  -  $R^6$  being an organic group),

said endcap group having eight or more  $\pi$  electrons.

10 27. A fluorocarbon resin as claimed in claim 26, wherein said organic group is selected from the group consisting of an alkyl group, an aryl group, an aralkyl group, and those substituted with halogen or nitrogen.

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28. A fluorocarbon resin as claimed in claim 20 26, wherein said endcap group contains 14 or more  $\pi$  electrons in total.

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29. A fluorocarbon resin as claimed in claim 26, wherein said fluorocarbon resin has a perfluoro ether skeleton.

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